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*Supplementary*

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# Effectiveness of Influenza-Prevention Interventions among Healthcare Workers: A Systematic Review and Meta-Analysis of Health Outcomes

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## Supplementary Appendix

This appendix formed part of the original submission.

### Methods appendix

A1. PI/ECO (population, intervention/exposure, comparison, and outcome).

### Study population

We included studies if the population was Healthcare Workers (HCWs) working in hospitals or medical clinics. These include physicians, nurses, emergency medical personnel, dentists and students, medical and nursing students, laboratory technicians, pharmacists, hospital volunteers and administrative staff.

### Intervention/exposure

The studies' inclusion criteria focused on two distinct types of interventions or exposures (pharmaceutical and non-pharmaceutical). The pharmaceutical interventions focused on influenza vaccination, which included both killed and live attenuated vaccines. For the nonpharmaceutical interventions, the wearing of face masks (medical, surgical, or N95 respirators) was the primary intervention studied.

### Comparison

The comparison group consisted of studies that included the population that did not receive any pharmaceutical measures or were not exposed to the non-pharmaceutical measures against influenza.

### Outcomes of interest

Studies were considered eligible if they addressed the effectiveness of any of the following: (1) Incidence of laboratory-confirmed influenza infections, (2) Incidence of influenza-like illness, and (3) Absenteeism from work.

## Search Strategy

### Pubmed

Search date: 30/09/2024.

Results: 801.

"Influenza vaccine*" OR "Influenza vaccination*" OR "Flu vaccine*" OR "Flu vaccination*" OR "Flu shot*" OR "Influenza shot*", ("Influenza Vaccines"[Mesh]), "facial mask*" OR "protective mask*" OR "mask protection" OR "facial protection" OR "face protection", "Respiratory Protective Devices"[Mesh], "Health care worker*" OR "Healthcare worker*" OR "Healthcare professional*" OR "Health care professional*", "Health Personnel"[Mesh:NoExp], Effective* OR efficacy OR impact* OR benefit* OR assessment OR evaluation, "Comparative Effectiveness Research"[Mesh], and outcome* OR absenteeism OR infection* OR episode* OR "laboratory-confirmedinfection*", "Patient Outcome Assessment"[MeAsh].

### Scopus

Search date: 30/09/2024

Results: 194

(TITLE-ABS-KEY (effective* OR efficac* OR impact* OR outcome* OR benefit*) AND TITLE-ABS-KEY ("protective


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measures" OR "protective interventions" OR "preventive measures" OR "safety measures") AND TITLE-ABS-KEY ("influenza vaccine" OR "flu vaccine" OR "influenza immunization" OR "flu shot") AND TITLE-ABS-KEY ("face mask" OR "surgical mask" OR respirator OR mask) AND TITLE-ABS-KEY ("healthcare workers" OR "healthcare professionals" OR "medical staff" OR "hospital staff" OR nurses OR doctors) AND TITLE-ABS-KEY ("laboratory confirmed influenza" OR "confirmed influenza" OR "lab confirmed influenza") AND TITLE-ABS-KEY ("influenza like illness" OR "ILI" OR "flu like illness" OR "influenza symptoms") AND TITLE-ABS-KEY ("days lost at work" OR absenteeism OR "work absence" OR "sick leave" OR "lost work days"))

### Google Scholar

Search date: 30/09/2024.

Results: 107.

"Influenza vaccine*" OR "Influenza vaccination*" OR "Flu vaccine*" OR "Flu vaccination*" OR "Flu shot*" OR "Influenza shot*", OR "facial mask*" OR "protective mask*" OR "mask protection" OR "facial protection" OR "face protection", AND "Health care worker*" OR "Healthcare worker*" OR "Healthcare professional*" OR "Health care professional*", AND Effective* OR efficacy OR impact* OR benefit* OR assessment OR evaluation, AND (outcome* OR absenteeism OR infection* OR "laboratory-confirmed-infection*")

## Results Appendix

### References of included studies

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## List of excluded studies with reasons

**Table B2:** List of excluded studies with reasons.

| No. | Study name | Reason for exclusion | Citation |
|---|---|---|---|
| 1 | Colombo et al. (2006) | Different setting | Not a hospital |
| 2 | Susa et al. (2000) | Non-English study | - |
| 3 | Liu et al (2005) | Non-English study | - |
| 4 | Hui et al (2008) | Different setting | Faculty of dentistry in a university |
| 5 | Nishi et al (2001) | Non-English study | |
| 6 | Murti et al. (2019) | Inapplicable study design | Case-control study |
| 7 | Rizzuto et al. (2006) | Different setting | Italian MoH |
| 8 | Al Qahtani et al. (2021) | Inapplicable study design | Case-control study |
| 9 | Keitel et al. (1997) | Different population | Not HCWs |
| 10 | Jones (1999) | Incomplete data | No SD |
| 11 | Mitchell et al. (1999) | Incomplete data | Data can't be extracted |
| 12 | Mostow et al. (1977) | Non-comparable interventions | compared split to whole influenza vaccine |
| 13 | Harada et al. (2003) | Non-English study | - |
| 14 | Loeb et al. (2009) | Non-comparable interventions | compared surgical mask to N95 |
| 15 | MacIntyre et al. (2015) | Non-comparable interventions | compared cloth masks to medical masks |
| 16 | MacIntyre et al. (2014) | Other | Not influenza virus specifically |
| 17 | Ritsuko et al. (2001) | Non-English study | - |
| 18 | Gianino et al. (2017) | Incomplete data | No SD |
| 19 | Costa et al. (2012) | Other | two influenza vaccines in a raw in a pandemic season |
| 20 | Cheng et al. (2010) | Different population | data include merged data for HCWs and patient's |
| 21 | Jacobs et al (2009) | Incomplete data | Incomplete data, definition of ILI is lacking |

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of repeated annual immunization with inactivated influenza virus vaccines over a five-year period. Vaccine. 1997 Jul 1;15(10):1114-22.

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## Meta-analyses forest plots

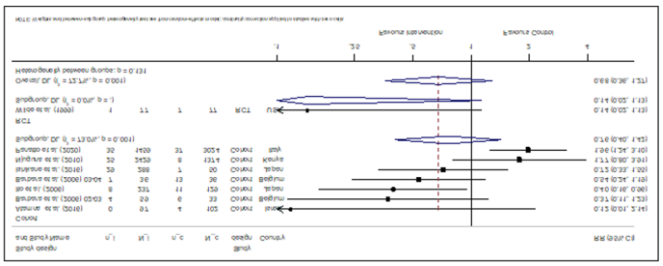


**Figure S1:** Forest plot of incidence of laboratory-confirmed influenza (LCI) in vaccinated vs. non-vaccinated healthcare workers sub-grouped by study design, n_i: Number of HCWs with LCI in the intervention group, N_i: Total number of HCWs in the intervention arm, n_c: Number of HCWs with LCI in the comparator group, N_c: Total number of HCWs in the comparator arm, RR: Risk Ratio.

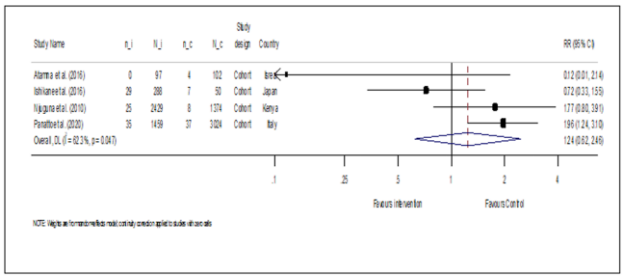


**Figure S2:** Forest plot of incidence of Laboratory-Confirmed Influenza (LCI) in vaccinated *vs.* non-vaccinated healthcare workers after removing studies prior to 2010, n_i: Number of HCWs with LCI in the intervention group, N_i: Total number of HCWs in the intervention arm, n_c: Number of HCWs with LCI in the comparator group, N_c: Total number of HCWs in the comparator arm, RR: Risk Ratio.

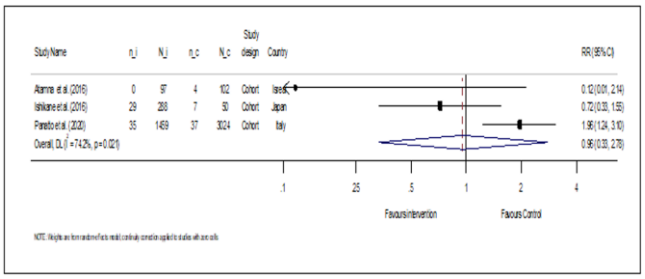


**Figure S3:** Forest plot of incidence of Laboratory-Confirmed Influenza (LCI) in vaccinated *vs.* non-vaccinated healthcare workers after removing studies prior to 2015, n_i: Number of HCWs with LCI in the intervention group, N_i: Total number of HCWs in the intervention arm, n_c: Number of HCWs with LCI in the comparator group, N_c: Total number of HCWs in the comparator arm, RR: Risk Ratio.



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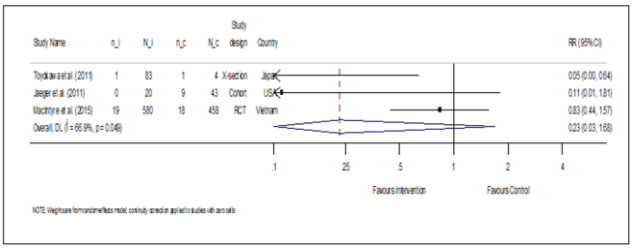


**Figure S4:** Forest plot of incidence of Laboratory-Confirmed Influenza (LCI) in the mask-users *vs.* non-mask-users healthcare workers, n_i: Number of HCWs with LCI in the intervention group, N_i: Total number of HCWs in the intervention arm, n_c: Number of HCWs with LCI in the comparator group, N_c: Total number of HCWs in the comparator arm, RR: Risk Ratio.

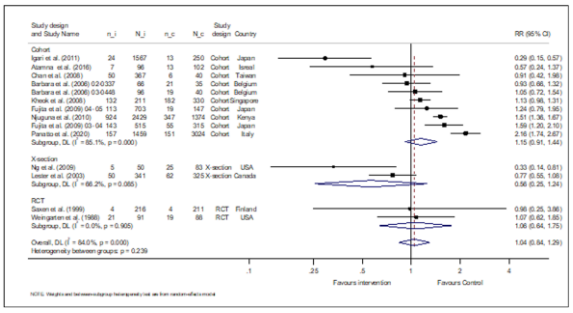


**Figure S5:** Forest plot of the incidence of Influenza-Like Illness (ILI) among vaccinated vs. non-vaccinated healthcare workers sub-grouped by study type, n_i: Number of HCWs with ILI in the intervention group, N_i: Total number of HCWs in the intervention arm, n_c: Number of HCWs with ILI in the comparator group, N_c: Total number of HCWs in the comparator arm, RR: risk ratio.

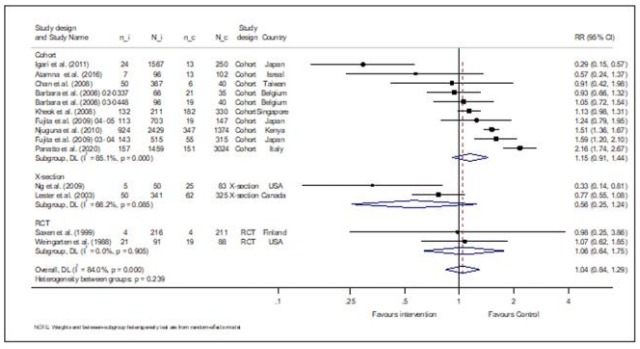


**Figure S6:** Forest plot of the incidence of incidence Influenza-Like Illness (ILI) among vaccinated *vs.* non-vaccinated healthcare workers sub-grouped by study sample size, n_i: Number of HCWs with ILI in the intervention group, N_i: Total number of HCWs in the intervention arm, n_c: Number of HCWs with ILI in the comparator group, N_c: Total number of HCWs in the comparator arm, RR: Risk Ratio.

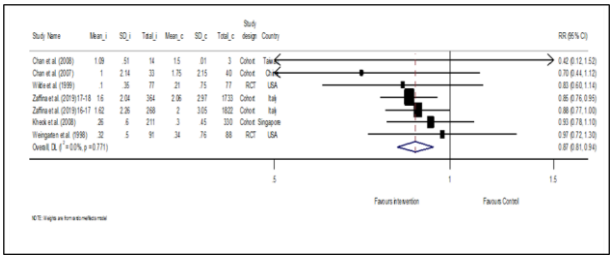


**Figure S7:** Forest plot of the incidence of absenteeism from work among vaccinated *vs.* non-vaccinated healthcare workers, Mean_i: Events mean in the intervention arm, SD_i: Standard deviation of the events in intervention arm, Total_i: Total number of participants in the intervention arm, Mean_c: Events mean in the comparator arm, SD_c: Standard deviation of the events the comparator arm, Total_c: Total number of participants the comparator arm, RR: Risk Ratio.

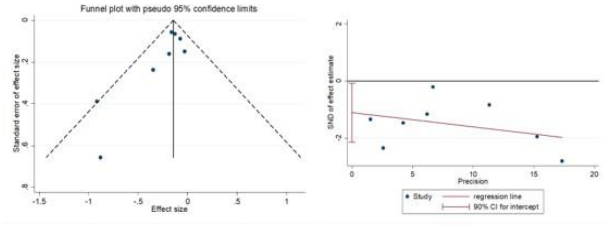



**Figure S8:** Funnel plot and Egger test of influenza vaccine and days off work.



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